

Typographical errors appear to be comparatively few. The meaning of the last sentence on p. 22 is, however, obscured by the misplacing of the word "much"; while on p. 125 we have *Suiæ* for *Suidæ*, and on p. 149 Australia for Australian. As regards other matters for criticism, it may be pointed out that the author admits that the term aurochs properly belongs to the extinct wild ox, and it is therefore not easy to see why he applies it to the bison in the plate of that animal. In the section on the wild ass (p. 60), the non-scientific reader will probably find it difficult to ascertain the proper name and the number of races of the Asiatic representative of that group; while the sportsman will gasp with astonishment when told (p. 63) that this animal may be ridden down by an expert horseman after a run of five-and-twenty miles (or does the author mean minutes?). On p. 139 the Tasmanian devil, under the synonym of the ursine *dasyure*, is made to do duty for two species. Finally, the palæontologist is likely to be staggered by the suggestion (p. 185) that the horn of the American birds commonly known as screamers is a direct inheritance from a dinosaurian ancestor.

Throughout, Mr. Beddard has made his book readable and mildly interesting; and it is especially satisfactory to find that he is conservative as regards the scientific names of the animals he discusses, and is, moreover, sparing in the use of such of these names as, he selects to designate, the various species. The book should form a valuable companion during a visit to the gardens in the Regent's Park, and likewise an excellent work of reference to those who really desire to learn something from visits of this nature.

R. L.

SCIENCE AT THE ROYAL ACADEMY BANQUET.

AMONG the guests of the Royal Academy of Arts, at the anniversary banquet on Saturday last, were eminent representatives of many branches of science. The president of the Academy, Sir E. J. Poynter, presided; and the Prince of Wales responded to the loyal toast proposed by the chairman. Sir E. Seymour having replied for the Navy and the Duke of Connaught for the Army, the president proposed the toast of "Science," the domain of which, he remarked, appeals to innumerable interests from its utilitarian side, and in its higher aspects deals with matters which, while they transcend the imagination with their speculative possibilities, require for their verification the utmost capacity of the intellect for exactitude and minuteness of research. Sir William Huggins, president of the Royal Society, replied to the toast in the following speech, which we take from the *Times* report of the banquet:—

I rise, as representing the Royal Society, to acknowledge the toast of science, so cordially honoured by her younger sister, the Royal Academy. I say sister, because art and science have in common the same object of worship and study—nature, in her varying moods and aspects; art "to exalt the forms of nature," science "to enlarge her powers." More than this, for to be accepted of nature, to be true artists or true men of science, both must possess an intuitive and profound insight into nature. The fine paintings which surround us are not mere transcripts of nature, but created visions of nature, revealing to the common eye the cryptic poetry and prose visible only to the second sight of the true artist—

"... a painter gazing at a face
Divinely through all hindrance finds the man behind it."

As truly, the man of science must be a seer, endowed with the open eye and power of imagination. At this point the sisters part company. The muse of art fixes on the canvas a momentary aspect of nature, or of the human

face divine. The muse of science strains her eyes to see what is behind the outward show, her quest is for the why and wherefore of nature's changes. But science is more than a presiding muse; she is in very deed a great beneficent power imminent in the lives of her votaries, a power such as was feebly foreshadowed in the tales of folk-lore by the Queen of the Good Fairies, richly rewarding by enchantment with all good things those who made her their friend. The seven-league boots and the magic steeds were but poor anticipations of the gifts of science—the railway, the motor, and the turbine-driven vessel. The enchantment of gold, jewels, feasts, and palaces are more than realised by the boundless resources which science places at man's disposal. Science, indeed, brings back the age of Methuselah. Even literally life is prolonged by increased power over disease. True life is not measured by the passing of the suns, but by the sum of our activities; not by the falling sands of the hour-glass, but by the living pulses of the mind. The flying train, the flashing of intelligence, night turned into day, and the thousand and one appliances of machinery crowd into one year a fulness of life which was possible to our fathers only, if at all, in many years. How great, then, would be the gifts of science to the nation in return for full national recognition—by placing science on an equality with the humanities in our universities and public schools, and by the endowment of laboratories worthy of the nation! With science nationally honoured, our armies and our ships could know no defeat, our machinery and our manufactures no rivalry in the world's markets, our every undertaking must prosper. Shall we then remain in deadly apathy and take no steps to have it so?

NOTES.

ON Sunday, the President of the French Republic entertained the King at the Elysée at a dinner party, at which 120 guests were present. The guests included distinguished authors, artists, musicians, and other representatives of intellectual activity, almost exclusively members of the Institute of France. By inviting leaders of literature, art, and science to meet the King, graceful recognition was given of the high place occupied by the muses in the polity of the Republic. In the days when sheer muscular force was the mainstay of a nation, bodily strength and prowess were rightly regarded as recommendations for Court favours; but now that brain-power instead of muscle determines the rate of national progress, the State that desires to advance must foster all the intellectual forces it possesses. This principle is well understood in France, and is also clearly recognised in Germany, where every man who makes notable contributions to knowledge of any kind, assists industrial progress, or creates works of distinguished merit, whatever they may be, is sure to receive personal encouragement from the Emperor. The presence of these leaders of thought is a striking characteristic of the German Court; while, on the other hand, their absence, and the overpowering influence of military interests, are distinguishing features of Russian, and, let us add, of British Court functions.

ON many occasions reference has been made in these columns to the excellent object lesson of the intimate connection between a scientifically organised system of education and national prosperity afforded by the success which has in recent years attended Japanese enterprise. It is gratifying to find that this insistence on our part is, in view of affairs in the Far East, now being echoed by our contemporaries. Commenting upon the account of its Tokio correspondent of the battle of Mukden, the *Times*, in a leader in the issue of April 25, remarked:—"We have before us evidence of national education in its highest and most complete manifestation—education such as we in this country have hardly begun to conceive. We have co-

ordinated intelligence at its best, fortified by an invincible moral, and employing a physical education capable of carrying out all its behests. We see these things not merely producing a small *corps d'élite* insignificant in comparison with the mass of the nation, but turning out half a million of men with brain power adequate for their direction." When it is remembered that Japan has established and perfected its system of education in the years since the passing of our first Elementary Education Act in 1870, it is easy to appreciate how profound and speedy can be the effect of an earnest and sustained effort on the part of the Government of a nation to develop its educational resources. There is hope that now our great newspapers are advocating the paramount claims of higher education and science we may see both more generously treated by the Government of this country.

THE inactivity shown by our statesmen in matters concerning the preservation of our ancient monuments compares very unfavourably with the measures taken in other countries to cherish their structures of antiquity. A timely article in the April number of the *Quarterly Review* directs attention to several cases of vandalism to show the precarious tenure on which this country holds so many of its artistic and historical treasures. Here we are almost devoid of the official and semi-official machinery which is actively engaged abroad. France and Austria have State-appointed commissions which exercise a general supervision over historical and artistic monuments, and see to their preservation and proper repair. The French list of structures regarded as of unmistakable national value contains about 2200 monuments, of which 318 are prehistoric in the form of dolmens or cromlechs. The care of monuments in all the German States is in the hands of official custodians or monument commissions, who are responsible to the Ministers of Public Instruction or of the Interior. The minor States of Europe exhibit a similar official interest in historical monuments. In our own country, however, only tentative efforts have been made at arrangements which on the Continent are in full working order. So far as any expenditure is concerned, the Ancient Monuments Acts are almost a dead letter. The indifference of the Government to the whole matter is sufficiently indicated by the fact that since the death of the inspector of ancient monuments, General Pitt-Rivers, in 1900, no successor has been appointed to the post, although no emoluments are attached to it. It seems impossible to get our so-called statesmen to see that unless the State shows active interest in the preservation of our ancient monuments, many of our national assets of the highest historical value are doomed to destruction. The public and public bodies would soon learn to prize such monuments if the Government would take steps to show that these structures are of national importance.

MR. E. T. NEWTON, F.R.S., palæontologist to the Geological Survey, retired on May 4 after a distinguished service extending over forty years. In 1865 he joined the Geological Survey as assistant naturalist under Prof. Huxley, while Murchison was director-general; and when Huxley severed his connection with the Museum of Practical Geology, he worked under the late Robert Etheridge until 1881. On Mr. Etheridge's transfer to the British Museum, Mr. George Sharman and Mr. E. T. Newton were appointed joint palæontologists to the Geological Survey, and on Mr. Sharman's retirement in 1897 Mr. Newton remained as chief of the palæontological department. The loss of his great experience and knowledge on all branches of palæontology, to say nothing of the

personal loss, will be widely felt in the museum at Jermyn Street by the officers and by the visitors who come for assistance in the study of fossils. It is satisfactory to learn that Dr. F. L. Kitchin has been appointed to succeed Mr. Newton; he received his palæontological training under Zittel, and joined the staff of the Geological Survey in 1898. He has published important monographs on fossil Invertebrata in the "Palæontologia Indica."

MR. JOHN GAVEY, C.B., engineer-in-chief to the Post Office, has been nominated for election as president for 1905-6 of the Institution of Electrical Engineers.

News has just reached this country that Dr. J. E. Dutton died at Kosongo, in the Congo, on February 27, while actively engaged in the investigation of trypanosomiasis and tick fever.

THE Paris Natural History Museum has accepted a bequest made by M. Emmanuel Drake del Castillo consisting of a herbarium, a botanical library, and a sum of 25,000 francs.

PROF. HANS MEYER, of the University of Vienna, we learn from *Science*, has accepted the invitation to deliver the Herter lectures at Johns Hopkins University on October 5 and 6. His subject will be "The Physiological Results of Pharmacological Research."

IT is announced that the New Mexico legislature has passed a law authorising a geological survey of the State; the sum of 1200*l.* has been voted for the purpose, and is to be expended under the direction of the New Mexico School of Mines at Socorro.

PROF. W. KÖNIG, of Greifswald, has been appointed ordinary professor and director of the physical laboratory at Giessen; Prof. M. Disteli, of Strassburg, professor of mathematics at Dresden; and Dr. Ernest Orloch professor at the National Physical Laboratory at Charlottenburg.

PROF. H. M. HOWE, professor of metallurgy at Columbia University, Bessemer medallist of the Iron and Steel Institute, has been elected foreign correspondent of the Paris Society for the Encouragement of Industry to succeed Sir Lowthian Bell. The other four recipients of this honour are Cannizzaro, Mendeléeff, Solvay, and Sir Henry Roscoe.

MR. J. H. HAMMOND has given 1000*l.* to establish a mining and metallurgical library at San Francisco. The State Mining Bureau already possesses an extensive library, but, for want of funds, it has not been possible to add new books during the past ten years. The new library is to be placed in the rooms of the Mining Bureau, but as a separate unit. Three trustees are to select the books.

THE President of the Board of Agriculture and Fisheries has appointed a departmental committee to inquire, by means of experimental investigation and otherwise, into the pathology and etiology of epizootic abortion, and to consider whether any, and, if so, what, preventive and remedial measures may with advantage be adopted with respect to that disease. The chairman of the committee is Prof. J. MacFadyean, principal of the Royal Veterinary College.

THE Baly medal, given every alternate year on the recommendation of the president and council of the Royal College of Physicians of London for distinguished work in the science of physiology, especially during the two years immediately preceding the award, has been awarded to Prof. Pawloff, of St. Petersburg. The Bisset Hawkins

gold medal for 1905, given triennially for work deserving special recognition as advancing sanitary science or promoting public health, has been awarded to Sir Patrick Manson, K.C.M.G.

A DECIDED earthquake shock was felt in the Vale of Llangollen, North Wales, about 1.40 a.m. on May 1. The disturbance lasted about four seconds, and was accompanied by loud rumbling sounds. The river Dee, which runs through the district, rose several feet during the night.

THE Paris correspondent of the *Times* reports that earthquake shocks were experienced at about 2 a.m. on April 29 over the whole of the Jura, the Rhone valley between Lyons and Valence, and the eastern portion of the *Central Massive*. All the shocks appear to have occurred simultaneously, and were accompanied by sudden and violent squalls, as well as by rumblings like distant thunder. An earthquake shock, lasting eight seconds, was recorded also at Chamonix. Subsequently the shocks recurred, though in a mitigated degree. At this place a new spring suddenly gushed from the ground as the result of the seismic disturbance, and the waters of the river Arve were swollen in consequence. The shock was felt at 2.45 a.m. at Turin and Domodossola. The seismographs at the observatories of Pavia, Padua, Ferrara, Modena, Ischia, and other towns also recorded disturbances. At Heidelberg Observatory the seismograph registered a decided earthquake of short duration at 2.49 a.m.

ATTENTION was recently directed in these notes (vol. Ixxi. p. 492) to a statement made in the *Times* that the Tower of Galileo on the hill of Arcetri, near Florence, has been practically destroyed in the course of recent building operations. Prof. A. Ricco, having been led by our note to make a special inquiry at Florence, now writes to point out that the so-called Torre del Gallo cannot in any way be considered as associated with the name of Galileo. Such an association was first suggested comparatively recently and purely gratuitously by the late proprietor of the tower, but no evidence in support of it can be traced either in the numerous letters or writings of Galileo. This was clearly pointed out by Gebler in 1878 in an article in the *Deutsche Rundschau*, and the most recent examination of Galileo's writings made on the occasion of the publication of the "national edition" of his works has given support to the same opinion. It may perhaps be surmised that a confusion of names has occurred, Torre del Gallo, literally the Cock's Tower, being wrongly regarded as a corruption of Torre di Galileo.

IN one of his recent articles on Stonehenge (vol. Ixxi. p. 391, February 23) Sir Norman Lockyer referred to the interesting fact, pointed out to him by Colonel Johnston, director of the Ordnance Survey, that the solstitial line in 1680 B.C. passes through not only the present centre of Stonehenge, but also through Sidbury Hill to the north-east, and the earthworks at Grovely Castle and Castle Ditches to the south-west. This continuation of the solstitial line from Stonehenge to other ancient structures is of great interest; but an even more remarkable relation found by Colonel Johnston is that Stonehenge, Old Sarum, and Grovely Castle occupy the points of an equilateral triangle each side of which is exactly six miles in length. A very definite connection is thus shown to exist between the various primitive works in the neighbourhood of Stonehenge. We notice that Mr. J. H. Spencer describes these relationships in an article in the April number

of the *Antiquary*, but he does not mention that the credit of the discovery of the connecting lines between the various monuments belongs to Colonel Johnston.

WE learn from the *Journal of the Society of Arts* that funds have been placed at the disposal of the council of the Society of Dyers and Colourists for distribution in the form of prizes for the solution of technical problems. The following prizes are now offered:—(1) 20*l.* for a satisfactory systematic tabulation of the reactions of dyestuffs on the fibre, and a comprehensive scheme for their identification on dyed fabrics; (2) 10*l.* for a trustworthy method of distinguishing between unmercerised and mercerised cotton of various qualities, and for the estimation of the degree of mercerisation without reference to lustre; (3) 20*l.* for a full investigation of the causes of the tendering of cotton dyed with sulphide blacks, and the best means of preventing such tendering; (4) 20*l.* for a satisfactory standardisation of the strength and elasticity of cotton yarns of various qualities and twists in the grey and bleached conditions; (5) 20*l.* for a full investigation of the average degree of tendering brought about in cotton yarn of various qualities by—(a) cross dyeing with acid colours; (b) dyeing aniline black; and (c) various other dyeing processes, with the object of fixing standards for the trade. Further information can be obtained from the hon. secretary, Mr. E. T. Holdsworth, Westholme, Great Horton, Bradford.

SATISFACTORY progress and general prosperity form the key-note of the report of the Zoological Gardens at Giza for the past year. The report is illustrated by the reproduction of a most interesting photograph of an aard-vark, or ant-bear, slightly marred by the effect of a shadow by the side of the nose.

IN a communication published in the *Anales of the Buenos Aires Museum* (vol. xii. pp. 1-64), Dr. F. Ameghino gives reasons for concluding that the single facet by which the astragalus of marsupials articulates inferiorly with the calcaneum is a specialised feature, derived from the more common type in which there are two such facets.

THE April issue of the *Proceedings of the Royal Irish Academy* is devoted to a list of Irish Cœlenterata, inclusive of the Ctenophora, by Miss Stephens. The list includes about 250 species, but since the north-west coast of Ireland has not yet been thoroughly worked, it cannot be regarded as complete.

Museum News is the title of a periodical issued by the Brooklyn (N.Y.) Institute of Arts and Sciences to replace the *Children's Museum News*, and intended to deal with matters connected with both the Central and the Children's Museum in that city. Special attention will be devoted to informing the public with regard to new exhibits and additions to the collections.

ACCORDING to its seventy-first report, Bootham School (York) is making a vigorous push in the direction of encouraging the study of natural science, and the natural history club has entered a period of renewed life and vigour. The report is illustrated with reproductions from two excellent photographs, one showing the nest and eggs of a black-headed gull, and the other the same eggs in the process of hatching.

THE seals frequenting Killala Bay and the Moy Estuary, in Mayo, form the subject of an article by Mr. R. Warren in the April *Zoologist*. Both the common and the grey seal frequent and breed in this district, the young being apparently born in most cases in caverns difficult of access.

The largest grey seal ever killed weighed 560 lb., but specimens scaling 740 lb. and 770 lb. are recorded from the Farne Islands, on the Northumberland coast.

"DIE SOGENNANTEN RIECHSTÄBCHEN DER CLADOCEREN" is the title of a paper in vol. xii. of *Plöner Forschungsberichte*, in which the author, Mr. D. J. Scourfield, of Leytonstone, discusses the function of the so-called olfactory setæ in this group of minute crustaceans. From the stronger and more numerous development of these bristles in the males, it is inferred that their sensory functions are more acute in this sex than in the females. As regards their probable function, the author is of opinion that while they are largely concerned in the perception of taste, yet that they may also serve in the recognition of other senses which may be as far removed from taste as is the latter from hearing.

THE *Journal of Hygiene* for April (v., No. 2) contains a number of interesting and important papers. Dr. Petrie discusses the relationship of the pseudo-diphtheria and diphtheria bacilli, and Dr. Boycott the relative seasonal prevalence of these two organisms. Dr. Petrie also describes trypanosomes observed in rabbits, moles, and certain birds. Dr. Savage, as the result of experiments made to ascertain the degree of sewage pollution of tidal waters, considers that mud samples yield more trustworthy evidence of the degree of contamination than either water or oyster samples. Other papers are by Dr. Hamilton Wright on preventive measures against beri-beri, Drs. Newsholme and Stevenson, and Dr. Hayward on statistical methods applied to birth-rates and life tables, and Dr. Mackie on a handy method of determining the amount of carbonic acid in air.

PART i. of the reports of the commission appointed for the investigation of Mediterranean fever under the supervision of the advisory committee of the Royal Society has just been issued. The first two reports, by Major Horrocks, R.A.M.C., deal with the problem of the saprophytic existence of the causative organism (*M. melitensis*) outside the human body. It is found that the organism will retain its vitality in sterilised tap water for thirty-seven days, in dry soil for forty-three days, and in moist soil for seventy-two days. The same observer was able to isolate the micrococcus from the urine, but not from the faeces, sweat or breath of patients. A series of experiments was instituted which showed that the micrococcus is absorbed by, and gives rise to the disease in, monkeys exposed to dust, or given food containing it. Staff-Surgeon Gilmour, R.N., and Dr. Zammit detail experiments on the isolation of the *M. melitensis* from the blood, and Staff-Surgeon Shaw, R.N., writes on the same subject and on experimental work in relation to animals.

AN interesting article on polished stone axes in history until the nineteenth century, by Dr. Marcel Baudouin and Lionel Bonnemère, will be found in the *Bulletin de la Société d'Anthropologie de Paris* (5e. sér., tome v., p. 496). Examples are given of their use at the present day as charms against lightning, storm, and other evils, and also they are credited with therapeutic efficacy. The *Báiruvs* of the Greeks was a polished stone implement; from classical times onwards these stones were supposed to have fallen from heaven, and at the present day this belief is current from western Europe to Malaysia.

VARIOUS folk-tales and other items of folklore will be found in the *Journal of the Asiatic Society of Bengal*; in vol. lxx., part iii., p. 99, Mr. S. C. Mitra records a new

accumulation-droll or cumulative folk-tale from Bihar; in vol. lxxi., part iii., p. 4, in the same *Journal*, Mr. H. P. Shastri describes a form of tree worship at Naihati; a female deity is supposed to reside in a date palm, when clods of earth are thrown at the tree as offerings to her, she at once pacifies children crying at the home of the devotee. Ten years later the author re-visited the spot, and found that sweets were then offered as well, that various other boons were prayed for, and a myth had grown up about the tree. The marriage customs of the Khonds are described by Mr. J. E. F. Pereira, from which it appears that they are gradually Hinduising their customs.

THE ideal forestry college forms the subject of an article in the *Indian Forester* (February); the suggestions made are based upon a selection of the advantages observed at various institutions, all of which, it is hardly necessary to state, lie outside the British Isles. College gardens and forests are mentioned as the most important adjuncts to laboratories and museums, and in these particulars the forestry school at Tharandt, Saxony, is well provided. In the matter of getting wider experience than can be obtained in the college forests, the students of the St. Petersburg Institute have the advantage of inspecting and completing a final course in some of the great forest areas of Russia.

JUDGING from the account by Mr. J. W. White published in vol. xxii., part iv., of the *Transactions and Proceedings of the Botanical Society of Edinburgh*, the Balearic Islands offer many attractions to the botanist who is contemplating a holiday. Not only do the islands lie outside the general track of tourists, but the flora is unusually rich, and a considerable number of the plants are endemic or confined to one of the neighbouring countries. Amongst the rarer curiosities a fragile vetchling, *Vicia bifoliata*, *Lepidium Carrerasii*, and a curious little shrubby *Daphne velutina* were obtained in Minorca, and in Majorca *Pimpinella Bicknellii*, which grows in splendid isolation, and a delicate rock-sheltered labiate, *Salvia Vigineuxii*, were discovered.

A RECORD of the progress of the *Albatross* Expedition to the eastern Pacific is given in a letter from Prof. Alexander Agassiz dated January 6 (*Amer. Journ. Science*, April). The influence of the Humboldt current on the marine life west of Callao was investigated. As far as 800 miles from the mainland, it affected both the surface and bottom fauna. Towards Easter Island, the surface fauna first became less abundant, and at a distance of from 1200 to 1400 miles from South America the trawl hauls were absolutely barren. The bottom of the greater part of the line was covered with manganese nodules on which were found attached a few siliceous sponges, an occasional ophiuran, and a few brachiopods and worm-tubes. The pelagic and intermediate fauna from Easter Island to 12° south latitude, in the direction of the Galapagos, was very poor, and indicated that the region was to the westward of the great Humboldt current. Beyond this limit the marine fauna was again rich and abundant, and great changes were noted in the temperature of the water between 50 and 300 fathoms. Soundings made eastward of the Galapagos and Easter Island indicate a gradual deepening of the ocean bed towards the Continent, as observed during the *Challenger* Expedition. On Easter Island some time was spent in examining the prehistoric monuments and the great quarries from which colossal images had been cut. Sculptured rocks were noted, and it was remarked that some of the cyclopean stones used in the ancient buildings exhibited excellent workmanship.

GEOLOGICAL and petrographical researches on the northern Urals have for some years been carried on by Prof. Louis Duparc and Dr. Francis Pearce. Their latest work (*Mém. Soc. de Physique et d'Hist. nat. de Génève*, xxxiv., fasc. v.) embraces a description of the eruptive rocks of the chain of Tilai-Kanjakowsky-Cérébriansky, in the Government of Perm. This range is composed of basic igneous rocks, of pyroxenites passing into koswites, which form the principal axis of the chain, with bordering gabbros elsewhere prominent; there are diorites, norites which are intercalated locally in both gabbros and pyroxenites, and dunites which are massive in places and also send veins into the gabbros and pyroxenites; and there are other eruptive rocks. All these are described in considerable detail and illustrated. Continuing their observations eastwards, the authors describe the quartzites and crystalline conglomerates of Aslanka and of Tépil, with, in the latter region, Devonian strata and various igneous rocks; and finally they deal with the crystalline schists and intrusive rocks of Koswinsky-Katéchersky-Tilai. The memoir is illustrated by pictorial views of the topographic features, by longitudinal sections, and by microscopic sections of the rocks.

THE report of the observatory department of the National Physical Laboratory for the year 1904 shows, as usual, a large amount of useful work; it is published separately, as appealing to a different class of workers from that interested in the engineering and physics departments. The work of the observatory deals with magnetic, meteorological, and seismological observations (separately), experiments and researches, verification of instruments and watches (separately), and miscellaneous commissions for inland, colonial, and foreign institutions, &c. It is observed that the electric trams have interfered with part of the magnetic work; the mean declination for the year was $16^{\circ} 37' 9$ W. The tabulations and automatic records of the meteorological observations are sent to the Meteorological Office for publication in detail; the Kew report contains monthly and yearly summaries of the results. The seismological observations are published in the report of the British Association; the largest disturbance recorded during the year took place on April 4, when the maximum amplitude exceeded 17 mm. The verification of instruments, exclusive of watches and chronometers, amounted to 25,797, of which 15,903 were clinical thermometers.

DURING a thunderstorm it has often been noticed that some flashes of lightning appear to "flicker," while others seem to leave a glow in their paths which lasts a second or two before entirely disappearing. In the first case the apparent trembling of the light is due to the fact that the observer is actually watching the passage of more than one flash following the same route. In multiple or intermittent lightning flashes there are sometimes as many as five or six separate flashes in a very brief interval of time, and the impression on the retina is an apparent flickering of a single flash. In the *Comptes rendus* (April 10) M. Em. Touchet directs attention to those particular flashes which leave a glow in their wake, and gives an illustration of a photograph of one he secured with a moving camera on April 12 of last year. The object of the communication is to point out that this glow is attributable to the incandescence of the air; but it seems to us that this is a fact already very well known. In photographing very bright lightning flashes with movable cameras it is a very common occurrence to get trails on the plate of the brighter portions of the flash, and if the plate and lens be very rapid it should be the rule rather than the exception.

NO. 1853, VOL. 72]

There are numerous examples of flashes which have been photographed showing this peculiarity; and it is a simple matter to differentiate between those due to multiplicity and those due to the incandescent air resulting from the original flash. Anyone interested in this question will find some typical photographs published by L. Weber (*Sitz. d. k. Preuss. Akad. d. Wiss.*, vol. xxxviii., 1889), Ladislaus von Szalay (*Met. Zeit.*, vol. xxxviii., 1903, p. 341), and B. Walter (*Jahrbuch d. Hamburgischen Wiss. Anstalten*, vol. xx., 1903). As M. Touchet refers to Dr. Hoffert's paper on intermittent lightning-flashes (*Phil. Mag.*, August, 1889), reference is there made to "streaks of light, showing that a very considerable residual illumination remains between the discharges," which indicates that the writer was quite familiar with the incandescence of the air due to the flash and its effect on the photographic film.

AN installation for the production of high-tension electricity, on view at Messrs. Isenthal and Co.'s, 85 Mortimer Street, Cavendish Square, W., has been examined by a representative of NATURE. The original source of the energy is an ordinary uni-directional current, and an important feature of the apparatus is a commutator which does away with the necessity for an interrupter. In the main circuit is a condenser of very large capacity, and the commutator breaks the circuit when the condenser is charged, so that no sparking is produced. The condenser employed is not large, and owes its compactness to the use of thin layers of aluminium oxide, prepared electrolytically, as the dielectric. The commutator has the appearance of a piece of engineering work, and should not require much attention. Oscillatory currents, with a frequency of about a thousand per second, are set up in the primary of an induction coil, and it is claimed that the impulses in the secondary are much stronger in one direction than in the other. The apparatus is also intended for the production of alternating currents, and some very interesting experiments are shown. An alternating current is sent through the coil of an electromagnet, the core being vertical; a sheet of paper is placed over the upper pole, and on the paper is scattered some iron dust (not filings); the dust forms itself into little spiked heaps which move and dance about. When the paper and iron dust are removed, and the forehead is placed near the pole of the magnet, the light of the room appears to fluctuate in intensity.

MESSRS. A. BROWN AND SONS, LTD., will publish during this month a work by Mr. J. R. Mortimer entitled "Forty Years' Researches in British and Saxon Burial Mounds of East Yorkshire, including Romano-British Discoveries and a Description of the Ancient Entrenchments on a Section of the Yorkshire Wolds."

THE report of the council of the Hampstead Scientific Society and the proceedings for 1904 have been received. Fifty-six new members were elected during the year, and the number of members is now 333. The number of meetings held in 1904 was thirty-three, and in addition there were four Christmas lectures to children and a course of six lectures on nature-study. Among lectures delivered at general meetings of the society may be mentioned one by Prof. S. P. Thompson, F.R.S., on Japanese magic mirrors, and one by Prof. W. Boyd Dawkins, F.R.S., on the incoming of the Brythons into Britain.

MESSRS. S. RENTELL AND CO., LTD., have published a fifth edition of "The Telegraphists' Guide to the Departmental and City and Guilds Examinations in Telegraphy," by Messrs. James Bell and S. Wilson. The contents have

been revised thoroughly, the chapters re-arranged, and much fresh matter introduced. The extra pages supply a description of Wheatstone's ABC instrument, a more detailed reference to batteries, single-needle working, duplex and Wheatstone automatic systems, repeaters, test cases, concentrator switch, wireless telegraphy, and other subjects.

No. 5 of the *Central*—the magazine of the Central Technical College—is very good, and may be regarded as even constituting an advance on its predecessors. It contains an account by Mr. R. Freeman of the design and construction of the steel-work of the bridge over the Zambezi at Victoria Falls, a continuation of the series of articles by Prof. Armstrong on the mechanism of combustion, and a description of the Klingenberg carriage switchgear by Mr. J. D. Griffin. The magazine is well and copiously illustrated.

WE have received from Mr. Geoffrey Martin a copy of a paper on the theory of solution, published in the *Journal of Physical Chemistry* (vol. ix. p. 149), giving a detailed account of views already briefly stated in a letter to NATURE (vol. lxx. p. 531). An attempt is made to explain the fundamental facts that for all substances there is a limit of solubility in each solvent, that the solubility increases as a rule with the temperature, and that molecules often dissociate on passing into solution.

AMONG the popular science lectures to be delivered at the Royal Victoria Hall, Waterloo Bridge Road, during May are the following:—May 9, fishes old and new, Dr. Smith Woodward, F.R.S.; May 23, some summits of the lost continent Atlantis, Mr. H. Ling

OUR ASTRONOMICAL COLUMN.

DISCOVERY OF A TENTH SATELLITE TO SATURN.—A telegram from the Kiel Centralstelle announces the discovery of a tenth satellite to Saturn by Prof. W. H. Pickering, who, it will be remembered, also discovered Phoebe, the ninth satellite.

The newly discovered satellite is very faint, being reported as three magnitudes fainter than Hyperion, the seventh satellite, which has a magnitude of about 17; its period is given as 21 days, and its orbital motion is direct.

THE ALLEGED IDENTITY OF COMETS "BROOKS 1889" AND LEXELL.—An abstract of a paper by Dr. Charles L. Poor, wherein he discusses the identity of Brooks's 1889 comet with the object known as Lexell's comet, is given in No. 4, vol. xiii., of *Popular Astronomy*. After mentioning the discovery and subsequent history of each body, he discusses the various perturbations to which each has been subjected, and then gives the results obtained from a re-computation of the orbit of Brooks's comet, using the observational data secured during the re-appearance of 1903. Finally, he arrives at the conclusion that the objects are not identical, although further evidence will be necessary before the question can be settled definitely.

ANCIENT DRAWINGS OF CELESTIAL PHENOMENA.—Parts xiii. and xiv. of the current volume of *Das Weltall* contain an interesting article by Dr. W. Lehmann, of Berlin, in which the ancient Mexican accounts of solar eclipses, comets, &c., are discussed. The article is freely illustrated by drawings of eclipses, comets, the moon, planets, &c., taken from the old accounts, and these drawings are most interesting as depicting the old Mexican ideas of these phenomena. For instance, the first is a contemporary drawing of the total solar eclipse of 1531 A.D., and shows plainly immense prominences and coronal wings.

MOUNT WILSON OBSERVATORY.—In No. 2, vol. xxi., of the *Astrophysical Journal*, Prof. Hale gives an account of the conditions of solar research at Mount Wilson, California, where he has recently established the Solar Observatory of the Carnegie Institution of Washington. In the

first of the two articles he enumerates the requirements of the site of such an observatory, and then discusses in detail the meteorological conditions, the seeing, the transparency of the atmosphere, and the instruments available at Mount Wilson.

In the second article the author describes the foundation, the equipment, and the programme of the observatory, and illustrates his description with photographs and diagrams of the site and of the various instruments and houses already erected or in course of erection.

ANOMALOUS DISPERSION AND "FLOCCULI."—In No. 3, vol. xxi., of the *Astrophysical Journal*, Prof. Julius advances the theory of anomalous dispersion to explain the varying appearances of the flocculi on spectroheliograph photographs. The "dark flocculi" of Prof. Hale are explained by the incurvature of the direct rays producing an excess of light in the bright flocculi, and therefore a deficit elsewhere, hence the dark regions naturally ensue.

The differences between the H_2 (calcium) and $H\beta$ (hydrogen) pictures obtained by Prof. Hale are explained by the supposition that the $H\beta$ rays are less strongly incurvated, and therefore rays of more varied refractive indices pass through the secondary slit, thereby producing a less dark and less defined image. On this assumption Prof. Julius states that the hydrogen photographs would show the fine details seen on the $K\alpha$ photographs if the dispersion employed were greater, or if the secondary slit were used narrower. Without requiring any other hypothesis, Prof. Julius explains by this theory all the anomalies seen on the spectroheliograms.

In the same journal, the same author also discusses the "dispersion bands" seen in the spectra of δ Orionis and Nova Persei, and, *inter alia*, arrives at the conclusion that the former star is not a spectroscopic binary.

ASTRONOMICAL SOCIETY OF AMERICA.—Abstracts of sixteen of the numerous papers read at the sixth meeting of the Astronomical and Astrophysical Society of America, held at Philadelphia last December, are given in No. 533 of *Science* by Mr. Frank B. Littel. The various titles are too numerous to mention here, but amongst them we may notice "The Constant of Aberration," by Prof. C. L. Doolittle, in which the author obtains the value $20^{\circ}540 \pm 0.0055$ from a series of zenith telescope observations made between December, 1889, and December, 1903; "The Reflex Zenith Tube," by the same author; "Variation of the Bright Hydrogen Lines in Stellar Spectra," by Miss Annie J. Cannon; "Planetary Spectrograms" and "The Canals of Mars," by Mr. Lowell; "The Coordination of Visual and Photographic Magnitudes," by Mr. J. A. Parkhurst; and "Recent Researches of the Henry Draper Memorial," by Prof. E. C. Pickering.

COLOUR IN WASPS OF THE GENUS POLISTES.

IN the paper referred to below¹ the author deals very fully with the various colour variations observable in the species of the genus under notice, and a very interesting account is given of the variability in colour-pattern, and of its gradual development in the nymphal and imaginal stages, illustrated by coloured plates i. and ii. A chemical analysis of the nature of the pigments is also given, and illustrations of the layers in which the pigments are located. Coloured plates iii. and iv. give figures of several of the different species of the genus—besides these plates there are excellent maps, showing the distribution of the various forms, and elaborate diagrams are provided, indicating the variations observable. The author has evidently spared no pains to render the treatment of the subject as exhaustive as possible, and as a study of colour variation this treatise seems to leave little to be desired. The problem attacked in this work, viz. "an inquiry into the nature and probable causes of specific differentiation in the genus Polistes," is one which is both difficult and perplexing.

The author commences at once by saying, "apart from differences in size, the characters used to separate the species are based almost exclusively on colour; accordingly, this in-

¹ "Coloration in Polistes." By Wilhelmine M. Enteman. Pp. 88 6 plates. (Carnegie Institution of Washington, November, 1904.)